

What Is Claimed Is:

- 10016236 "121204
1. A method for protecting a plant from pathogen attack, comprising the steps of:
 - (a) providing an immunomodulated plant having a first level of disease resistance; and
 - (b) applying to said immunomodulated plant at least one microbicide that confers a second level of disease resistance;
 - (c) whereby application of said microbicide to said immunomodulated plant confers a synergistically enhanced third level of disease resistance that is greater than the sum of the first and second levels of disease resistance.
 2. A method according to claim 1, wherein said immunomodulated plant is a constitutive immunity (*cim*) mutant plant.
 3. A method according to claim 2, wherein said *cim* mutant plant is selected from a population of plants according to the following steps:
 - (a) evaluating the expression of SAR genes in uninfected plants that are phenotypically normal in that said uninfected plants lack a lesion mimic phenotype; and
 - (b) selecting uninfected plants that constitutively express SAR genes in the absence of viral, bacterial, or fungal infection.
 4. A method according to claim 1, wherein said immunomodulated plant is a lesion mimic mutant plant.
 5. A method according to claim 4, wherein said lesion mimic mutant plant is selected from a population of plants according to the following steps:
 - (a) evaluating the expression of SAR genes in uninfected plants that have a lesion mimic phenotype; and
 - (b) selecting uninfected plants that constitutively express SAR genes in the absence of viral, bacterial, or fungal infection.

6. A method according to claim 1, wherein said immunomodulated plant is obtained by recombinant expression in a plant of an SAR gene.

7. A method according to claim 6, wherein said SAR gene comprises a DNA molecule that encodes a NIM1 protein involved in the signal transduction cascade leading to systemic acquired resistance in plants.

8. A method according to claim 7, wherein said NIM1 protein comprises the amino acid sequence set forth in SEQ ID NO:2.

9. A method according to claim 7, wherein said DNA molecule hybridizes under the following conditions to the coding sequence set forth in SEQ ID NO:1: hybridization in 1%BSA; 520mM NaPO₄, pH7.2; 7% lauryl sulfate, sodium salt; 1mM EDTA; 250 mM sodium chloride at 55°C for 18-24h, and wash in 6XSSC for 15 min. (X3) 3XSSC for 15 min. (X1) at 55°C.

10. A method according to claim 7, wherein said DNA molecule comprises the coding sequence set forth in SEQ ID NO:1.

11. A method according to claim 7, wherein said DNA molecule hybridizes under the following conditions to a DNA molecule that encodes a NIM1 protein comprising the amino acid sequence set forth in SEQ ID NO:2: hybridization in 1%BSA; 520mM NaPO₄, pH7.2; 7% lauryl sulfate, sodium salt; 1mM EDTA; 250 mM sodium chloride at 55°C for 18-24h, and wash in 6XSSC for 15 min. (X3) 3XSSC for 15 min. (X1) at 55°C.

12. A method according to claim 6, wherein said SAR gene encodes an altered form of a NIM1 protein that acts as a dominant-negative regulator of the SAR signal transduction pathway.

13. A method according to claim 12, wherein said altered form of the NIM1 protein has alanines instead of serines in amino acid positions corresponding to positions 55 and 59 of SEQ ID NO:2.

14. A method according to claim 12, wherein said altered form of the NIM1 protein comprises the amino acid sequence shown in SEQ ID NO:8.

15. A method according to claim 13, wherein said DNA molecule comprises the nucleotide sequence shown in SEQ ID NO:7.

16. A method according to claim 13, wherein said DNA molecule hybridizes under the following conditions to the nucleotide sequence set forth in SEQ ID NO:7: hybridization in 1%BSA; 520mM NaPO₄, pH7.2; 7% lauryl sulfate, sodium salt; 1mM EDTA; 250 mM sodium chloride at 55°C for 18-24h, and wash in 6XSSC for 15 min. (X3) 3XSSC for 15 min. (X1) at 55°C.

17. A method according to claim 12, wherein said altered form of the NIM1 protein has an N-terminal truncation of amino acids corresponding approximately to amino acid positions 1-125 of SEQ ID NO:2.

18. A method according to claim 12, wherein said altered form of the NIM1 protein comprises the amino acid sequence shown in SEQ ID NO:10.

19. A method according to claim 17, wherein said DNA molecule comprises the nucleotide sequence shown in SEQ ID NO:9.

20. A method according to claim 17, wherein said DNA molecule hybridizes under the following conditions to the nucleotide sequence set forth in SEQ ID NO:9: hybridization in 1%BSA; 520mM NaPO₄, pH7.2; 7% lauryl sulfate, sodium salt; 1mM EDTA; 250 mM sodium chloride at 55°C for 18-24h, and wash in 6XSSC for 15 min. (X3) 3XSSC for 15 min. (X1) at 55°C.

21. A method according to claim 12, wherein said altered form of the NIM1 protein has a C-terminal truncation of amino acids corresponding approximately to amino acid positions 522-593 of SEQ ID NO:2.

22. A method according to claim 12, wherein said altered form of the NIM1 protein comprises the amino acid sequence shown in SEQ ID NO:12.

23. A method according to claim 21, wherein said DNA molecule comprises the nucleotide sequence shown in SEQ ID NO:11.

24. A method according to claim 21, wherein said DNA molecule hybridizes under the following conditions to the nucleotide sequence set forth in SEQ ID NO:11: hybridization in 1%BSA; 520mM NaPO₄, pH7.2; 7% lauryl sulfate, sodium salt; 1mM EDTA; 250 mM sodium chloride at 55°C for 18-24h, and wash in 6XSSC for 15 min. (X3) 3XSSC for 15 min. (X1) at 55°C.

25. A method according to claim 12, wherein said altered form of the NIM1 protein has an N-terminal truncation of amino acids corresponding approximately to amino acid positions 1-125 of SEQ ID NO:2 and a C-terminal truncation of amino acids corresponding approximately to amino acid positions 522-593 of SEQ ID NO:2.

26. A method according to claim 12, wherein said altered form of the NIM1 protein comprises the amino acid sequence shown in SEQ ID NO:14.

27. A method according to claim 25, wherein said DNA molecule comprises the nucleotide sequence shown in SEQ ID NO:13.

28. A method according to claim 25, wherein said DNA molecule hybridizes under the following conditions to the nucleotide sequence set forth in SEQ ID NO:13: hybridization in 1%BSA; 520mM NaPO₄, pH7.2; 7% lauryl sulfate, sodium salt; 1mM EDTA; 250 mM sodium

chloride at 55°C for 18-24h, and wash in 6XSSC for 15 min. (X3) 3XSSC for 15 min. (X1) at 55°C.

29. A method according to claim 12, wherein said altered form of the NIM1 protein consists essentially of ankyrin motifs corresponding approximately to amino acid positions 103-362 of SEQ ID NO:2.

30. A method according to claim 12, wherein said altered form of the NIM1 protein comprises the amino acid sequence shown in SEQ ID NO:16.

31. A method according to claim 29, wherein said DNA molecule comprises the nucleotide sequence shown in SEQ ID NO:15.

32. A method according to claim 29, wherein said DNA molecule hybridizes under the following conditions to the nucleotide sequence set forth in SEQ ID NO:15: hybridization in 1%BSA; 520mM NaPO₄, pH7.2; 7% lauryl sulfate, sodium salt; 1mM EDTA; 250 mM sodium chloride at 55°C for 18-24h, and wash in 6XSSC for 15 min. (X3) 3XSSC for 15 min. (X1) at 55°C.

33. A method according to claim 1, wherein the step of providing an immunomodulated plant comprises applying a chemical inducer of systemic acquired resistance to said plant.

34. A method according to claim 33, wherein said chemical inducer of systemic acquired resistance is a benzothiadiazole.

35. A method according to claim 34, wherein said benzothiadiazole is benzo(1,2,3)thiadiazole-7-carbothioic acid S-methyl ester.

36. A method according to claim 33, wherein said chemical inducer of systemic acquired resistance is an isonicotinic acid compound.

37. A method according to claim 33, wherein said chemical inducer of systemic acquired resistance is a salicylic acid compound.

38. A method according to claim 1, wherein said microbicide is a fungicide selected from the following group:

- 4-[3-(4-chlorophenyl)-3-(3,4-dimethoxyphenyl)acryloyl]morpholine ("dimethomorph");
5-methyl-1,2,4-triazolo[3,4-b][1,3]benzothiazole ("tricyclazole");
3-allyloxy-1,2-benzothiazole-1,1-dioxide ("probonazole");
 μ -[2-(4-chlorophenyl)ethyl]- μ -(1,1-dimethylethyl)-1H-1,2,4-triazole-1-ethanol, ("tebuconazol");
1-[[3-(2-chlorophenyl)-2-(4-fluorophenyl)oxiran-2-yl]methyl]-1H-1,2,4-triazole, ("epoxyconazol");
 μ -(4-chlorophenyl)- μ -(1-cyclopropylethyl)-1H-1,2,4-triazole-1-ethanol, ("cyproconazol");
5-(4-chlorobenzyl)-2,2-dimethyl-1-(1H-1,2,4-triazol-1-ylmethyl)-cyclopentanol, ("metconazol");
2-(2,4-dichlorophenyl)-3-(1H-1,2,4-triazol-1-yl)-propyl-1,1,2,2-tetrafluoroethyl-ether, ("tetraconazol");
methyl-(E)-2-{2-[6-(2-cyanophenoxy)pyrimidin-4-yloxy]phenyl}-3-methoxyacrylate, ("ICI A 5504", "azoxystrobin");
methyl-(E)-2-methoximino-2-[[μ -(o-tolyloxy)-o-tolyl]acetate, ("BAS 490 F", "cresoxime methyl");
2-(2-phenoxyphenyl)-(E)-2-methoximino-N-methylacetamide);
[2-(2,5-dimethylphenoxy)methyl]-phenyl-(E)-2-methoximino-N-methylacetamide);
(1R,3S/1S,3R)-2,2-dichloro-N-[(R)-1-(4-chlorophenyl)ethyl]-1-ethyl-3-methylcyclopropanecarboxamide, ("KTU 3616");
manganese ethylenebis(dithiocarbamate)polymer-zinc complex, ("mancozeb");
1-[2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan-2-ylmethyl]-1H-1,2,4-triazole, ("propiconazole");

1-{2-[2-chloro-4-(4-chlorophenoxy)phenyl]-4-methyl-1,3-dioxolan-2-ylmethyl}-1H-1,2,4-triazole, ("difenoconazole");
 1-[2-(2,4-dichlorophenyl)pentyl]-1H-1,2,4-triazole, ("penconazole");
 cis-4-[3-(4-tert-butylphenyl)-2-methylpropyl]-2,6-dimethylmorpholine,
 ("fenpropimorph");
 1-[3-(4-tert-butylphenyl)-2-methylpropyl]-piperidine, ("fenpropidin");
 4-cyclopropyl-6-methyl-N-phenyl-2-pyrimidinamine ("cyprodinil");
 (RS)-N-(2,6-dimethylphenyl)-N-(methoxyacetyl)-alanine methyl ester ("metalaxyl",
 "ridomil");
 (R)-N-(2,6-dimethylphenyl)-N-(methoxyacetyl)-alanine methyl ester ("R-metalaxyl");
 1,2,5,6-tetrahydro-4H-pyrrolo[3,2,1-ij]quinolin-4-one ("pyroquilon"); and
 ethyl hydrogen phosphonate ("fosetyl").

39. A method according to claim 2, wherein said microbicide is a fungicide selected from the following group:

4-[3-(4-chlorophenyl)-3-(3,4-dimethoxyphenyl)acryloyl]morpholine ("dimethomorph");
 5-methyl-1,2,4-triazolo[3,4-b][1,3]benzothiazole ("tricyclazole");
 3-allyloxy-1,2-benzothiazole-1,1-dioxide ("probonazole");
 μ -[2-(4-chlorophenyl)ethyl]- μ -(1,1-dimethylethyl)-1H-1,2,4-triazole-1-ethanol, ("tebuconazol");
 1-[[3-(2-chlorophenyl)-2-(4-fluorophenyl)oxiran-2-yl]methyl]-1H-1,2,4-triazole,
 ("epoxyconazol");
 μ -(4-chlorophenyl)- μ -(1-cyclopropylethyl)-1H-1,2,4-triazole-1-ethanol,
 ("cyproconazol");
 5-(4-chlorobenzyl)-2,2-dimethyl-1-[(1H-1,2,4-triazol-1-yl)methyl]-cyclopentanol,
 ("metconazol");
 2-(2,4-dichlorophenyl)-3-(1H-1,2,4-triazol-1-yl)-propyl-1,1,2,2-tetrafluoroethyl-ether,
 ("tetraconazol");
 methyl (E)-2-{2-[6-(2-cyanophenoxy)pyrimidin-4-yloxy]phenyl}-3-methoxyacrylate,
 ("ICI A 5504", "azoxystrobin");

methyl-(E)--2-methoximino--2- $[\mu$ -(o-tolyloxy)--o-tolyl]acetate, ("BAS 490 F", "cresoxime methyl");
 2-(2-phenoxyphenyl)-(E)-2-methoximino--N-methylacetamide;
 [2-(2,5-dimethylphenoxyethyl)-phenyl]-(E)--2-methoximino-N-methylacetamide;
 (1R,3S/1S,3R)-2,2-dichloro--N-[(R)-1-(4-chlorophenyl)ethyl]--1-ethyl-3-methylcyclopropanecarboxamide, ("KTU 3616");
 manganese ethylenebis(dithiocarbamate)polymer-zinc complex, ("mancozeb");
 1-[2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan--2-ylmethyl]--1H-1,2,4--triazole, ("propiconazole");
 1-{2-[2-chloro-4-(4-chlorophenoxy)phenyl]-4-methyl-1,3-dioxolan--2-ylmethyl}--1H-1,2,4--triazole, ("difenoconazole");
 1-[2-(2,4-dichlorophenyl)pentyl]--1H-1,2,4-triazole, ("penconazole");
 cis-4-[3-(4-tert-butylphenyl)--2-methylpropyl]--2,6-dimethylmorpholine, ("fenpropimorph");
 1-[3-(4-tert-butylphenyl)--2-methylpropyl]-piperidine, ("fenpropidin");
 4-cyclopropyl-6-methyl-N-phenyl-2-pyrimidinamine ("cyprodinil");
 (RS)-N-(2,6-dimethylphenyl)-N-(methoxyacetyl)-alanine methyl ester ("metalaxyl", "ridomil");
 (R)-N-(2,6-dimethylphenyl)-N-(methoxyacetyl)-alanine methyl ester ("R-metalaxyl");
 1,2,5,6-tetrahydro-4H-pyrrolo[3,2,1-ij]quinolin-4-one ("pyroquilon"); and
 ethyl hydrogen phosphonate ("fosetyl").

40. A method according to claim 39, wherein said fungicide is metalaxyl.

41. A method according to claim 4, wherein said microbicide is a fungicide selected from the following group:

4-[3-(4-chlorophenyl)-3-(3,4-dimethoxyphenyl)acryloyl]morpholine ("dimethomorph");
 5-methyl-1,2,4-triazolo[3,4-b][1,3]benzothiazole ("tricyclazole");
 3-allyloxy-1,2-benzothiazole-1,1-dioxide ("probonazole");
 μ -[2-(4-chlorophenyl)ethyl]-- μ -(1,1-dimethylethyl)-1H-1,2,4-triazole-1-ethanol, ("tebuconazol");

1-[[3-(2-chlorophenyl)-2--(4-fluorophenyl)oxiran-2-yl]methyl]-1H-1,2,4-triazole,
("epoxyconazol");

μ -(4-chlorophenyl)-- μ -(1-cyclopropylethyl)--1H-1,2,4-triazole--1-ethanol,
("cyproconazol");

5-(4-chlorobenzyl)--2,2-dimethyl-1--(1H-1,2,4-triazol-1--ylmethyl)-cyclopentanol,
("metconazol");

2-(2,4-dichlorophenyl)--3-(1H-1,2,4-triazol-1-yl)-propyl--1,1,2,2-tetrafluoroethyl-ether,
("tetraconazol");

methyl-(E)-2-{2-[6-(2-cyanophenoxy)pyrimidin-4-yloxy]phenyl}--3-methoxyacrylate,
("ICI A 5504", "azoxystrobin");

methyl-(E)--2-methoximino--2-[[μ -(o-tolyloxy)--o-tolyl]acetate, ("BAS 490 F", "cresoxime
methyl");

2-(2-phenoxyphenyl)-(E)-2-methoximino--N-methylacetamide);

[2-(2,5-dimethylphenoxy)methyl]-phenyl-(E)--2-methoximino-N-methylacetamide);

(1R,3S/1S,3R)-2,2-dichloro--N-[(R)-1-(4-chlorophenyl)ethyl]--1-ethyl-3-
methylcyclopropanecarboxamide, ("KTU 3616");

manganese ethylenebis(dithiocarbamate)polymer-zinc complex, ("mancozeb");

1-[2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan-2-ylmethyl]--1H-1,2,4--triazole,
("propiconazole");

1-{2-[2-chloro-4-(4-chlorophenoxy)phenyl]-4-methyl--1,3-dioxolan--2-ylmethyl}--1H-
1,2,4--triazole, ("difenoconazole");

1-[2-(2,4-dichlorophenyl)pentyl--1H-1,2,4-triazole, ("penconazole");

cis-4-[3-(4-tert-butylphenyl)--2-methylpropyl]--2,6-dimethylmorpholine,
("fenpropimorph");

1-[3-(4-tert-butylphenyl)--2-methylpropyl]-piperidine, ("fenpropidin");

4-cyclopropyl-6-methyl-N-phenyl-2-pyrimidinamine ("cyprodinil");

(RS)-N-(2,6-dimethylphenyl--N-(methoxyacetyl)-alanine methyl ester ("metalaxyl",
"ridomil");

(R)-N-(2,6-dimethylphenyl--N-(methoxyacetyl)-alanine methyl ester ("R-metalaxyl");

1,2,5,6-tetrahydro--4H-pyrrolo[3,2,1-ij]quinolin-4-one ("pyroquilon"); and

ethyl hydrogen phosphonate ("fosetyl").

42. A method according to claim 6, wherein said microbicide is a fungicide selected from the following group:

- 4-[3-(4-chlorophenyl)-3-(3,4-dimethoxyphenyl)acryloyl]morpholine ("dimethomorph");
5-methyl-1,2,4-triazolo[3,4-b][1,3]benzothiazole ("tricyclazole");
3-allyloxy-1,2-benzothiazole-1,1-dioxide ("probonazole");
 μ -[2-(4-chlorophenyl)ethyl]- μ -(1,1-dimethylethyl)-1H-1,2,4-triazole-1-ethanol, ("tebuconazol");
1-[[3-(2-chlorophenyl)-2--(4-fluorophenyl)oxiran-2-yl]methyl]-1H-1,2,4-triazole, ("epoxyconazol");
 μ -(4-chlorophenyl)-- μ -(1-cyclopropylethyl)--1H-1,2,4-triazole--1-ethanol, ("cyproconazol");
5-(4-chlorobenzyl)--2,2-dimethyl-1--(1H-1,2,4-triazol-1-yl)methyl--cyclopentanol, ("metconazol");
2-(2,4-dichlorophenyl)--3-(1H-1,2,4-triazol-1-yl)-propyl--1,1,2,2-tetrafluoroethyl-ether, ("tetraconazol");
methyl-(E)-2-{2-[6-(2-cyanophenoxy)pyrimidin-4-yloxy]phenyl}--3-methoxyacrylate, ("ICI A 5504", "azoxystrobin");
methyl-(E)--2-methoximino--2-[μ -(o-tolyloxy)--o-tolyl]acetate, ("BAS 490 F", "cresoxime methyl");
2-(2-phenoxyphenyl)-(E)-2-methoximino--N-methylacetamide);
[2-(2,5-dimethylphenoxy)methyl]-phenyl)-(E)--2-methoximino-N-methylacetamide);
(1R,3S/1S,3R)-2,2-dichloro--N-[(R)-1-(4-chlorophenyl)ethyl]--1-ethyl-3-methylcyclopropanecarboxamide, ("KTU 3616");
manganese ethylenebis(dithiocarbamate)polymer-zinc complex, ("mancozeb");
1-[2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan--2-ylmethyl]--1H-1,2,4--triazole, ("propiconazole");
1-{2-[2-chloro-4-(4-chlorophenoxy)phenyl]-4-methyl--1,3-dioxolan--2-ylmethyl}--1H-1,2,4--triazole, ("difenoconazole");
1-[2-(2,4-dichlorophenyl)pentyl]--1H-1,2,4-triazole, ("penconazole");

cis-4-[3-(4-tert-butylphenyl)--2-methylpropyl]-2,6-dimethylmorpholine,
("fenpropimorph");

1-[3-(4-tert-butylphenyl)--2-methylpropyl]-piperidine, ("fenpropidin");

4-cyclopropyl-6-methyl-N-phenyl-2-pyrimidinamine ("cyprodinil");

(RS)-N-(2,6-dimethylphenyl)-N-(methoxyacetyl)-alanine methyl ester ("metalaxyl",
"ridomil");

(R)-N-(2,6-dimethylphenyl)-N-(methoxyacetyl)-alanine methyl ester ("R-metalaxyl");

1,2,5,6-tetrahydro-4H-pyrrolo[3,2,1-ij]quinolin-4-one ("pyroquilon"); and
ethyl hydrogen phosphonate ("fosetyl").

43. A method according to claim 7, wherein said microbicide is a fungicide selected
from the following group:

4-[3-(4-chlorophenyl)-3-(3,4-dimethoxyphenyl)acryloyl]morpholine ("dimethomorph");

5-methyl-1,2,4-triazolo[3,4-b][1,3]benzothiazole ("tricyclazole");

3-allyloxy-1,2-benzothiazole-1,1-dioxide ("probonazole");

μ -[2-(4-chlorophenyl)ethyl]- μ -(1,1-dimethylethyl)-1H-1,2,4-triazole-1-
ethanol, ("tebuconazol");

1-[[3-(2-chlorophenyl)-2-(4-fluorophenyl)oxiran-2-yl]methyl]-1H-1,2,4-triazole,
("epoxyconazol");

μ -(4-chlorophenyl)- μ -(1-cyclopropylethyl)-1H-1,2,4-triazole-1-ethanol,
("cyproconazol");

5-(4-chlorobenzyl)-2,2-dimethyl-1-[(1H-1,2,4-triazol-1-yl)methyl]-cyclopentanol,
("metconazol");

2-(2,4-dichlorophenyl)-3-(1H-1,2,4-triazol-1-yl)-propyl-1,1,2,2-tetrafluoroethyl-ether,
("tetraconazol");

methyl-(E)-2-{2-[6-(2-cyanophenoxy)pyrimidin-4-yloxy]phenyl}-3-methoxyacrylate,
("ICI A 5504", "azoxystrobin");

methyl-(E)-2-methoximino-2-[μ -(o-tolyloxy)-o-tolyl]acetate, ("BAS 490 F", "cresoxime
methyl");

2-(2-phenoxyphenyl)-(E)-2-methoximino-N-methylacetamide);

[2-(2,5-dimethylphenoxy)methyl]-phenyl-(E)-2-methoximino-N-methylacetamide);

(1R,3S/1S,3R)-2,2-dichloro--N-[(R)-1-(4-chlorophenyl)ethyl]-1-ethyl-3-methylcyclopropanecarboxamide, ("KTU 3616");
 manganese ethylenebis(dithiocarbamate)polymer-zinc complex, ("mancøzeb");
 1-[2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan-2-ylmethyl]-1H-1,2,4-triazole, ("propiconazole");
 1-{2-[2-chloro-4-(4-chlorophenoxy)phenyl]-4-methyl-1,3-dioxolan-2-ylmethyl}-1H-1,2,4-triazole, ("difenoconazole");
 1-[2-(2,4-dichlorophenyl)pentyl]-1H-1,2,4-triazole, ("penconazole");
 cis-4-[3-(4-tert-butylphenyl)-2-methylpropyl]-2,6-dimethylmorpholine, ("fenpropimorph");
 1-[3-(4-tert-butylphenyl)-2-methylpropyl]-piperidine, ("fenpropidin");
 4-cyclopropyl-6-methyl-N-phenyl-2-pyrimidinamine ("cyprodinil");
 (RS)-N-(2,6-dimethylphenyl)-N-(methoxyacetyl)-alanine methyl ester ("metalaxyl", "ridomil");
 (R)-N-(2,6-dimethylphenyl)-N-(methoxyacetyl)-alanine methyl ester ("R-metalaxyl");
 1,2,5,6-tetrahydro-4H-pyrrolo[3,2,1-ij]quinolin-4-one ("pyroquilon"); and
 ethyl hydrogen phosphonate ("fosetyl").

44. A method according to claim 43, wherein said fungicide is metalaxyl.
45. A method according to claim 43, wherein said fungicide is fosetyl.
46. A method according to claim 12, wherein said microbicide is a fungicide selected from the following group:
- 4-[3-(4-chlorophenyl)-3-(3,4-dimethoxyphenyl)acryloyl]morpholine ("dimethomorph");
 5-methyl-1,2,4-triazolo[3,4-b][1,3]benzothiazole ("tricyclazole");
 3-allyloxy-1,2-benzothiazole-1,1-dioxide ("probonazole");
 μ -[2-(4-chlorophenyl)ethyl]- μ -(1,1-dimethylethyl)-1H-1,2,4-triazole-1-ethanol, ("tebuconazol");
 1-[[3-(2-chlorophenyl)-2-(4-fluorophenyl)oxiran-2-yl]methyl]-1H-1,2,4-triazole, ("epoxyconazol");

μ -(4-chlorophenyl)-- μ -(1-cyclopropylethyl)--1H-1,2,4-triazole--1-ethanol,
 ("cyproconazol");
 5-(4-chlorobenzyl)--2,2-dimethyl-1--(1H-1,2,4-triazol-1-ylmethyl)-cyclopentanol,
 ("metconazol");
 2-(2,4-dichlorophenyl)--3-(1H-1,2,4-triazol-1-yl)-propyl--1,1,2,2-tetrafluoroethyl-ether,
 ("tetraconazol");
 methyl-(E)-2-{2-[6-(2-cyanophenoxy)pyrimidin-4-yloxy]phenyl}--3-methoxyacrylate,
 ("ICI A 5504", "azoxystrobin");
 methyl-(E)--2-methoximino--2-[μ -(o-tolyloxy)--o-tolyl]acetate, ("BAS 490 F", "cresoxime
 methyl");
 2-(2-phenoxyphenyl)-(E)-2-methoximino--N-methylacetamide);
 [2-(2,5-dimethylphenoxyethyl)-phenyl]-(E)--2-methoximino-N-methylacetamide);
 (1R,3S/1S,3R)-2,2-dichloro--N-[(R)-1-(4-chlorophenyl)ethyl]--1-ethyl-3-
 methylcyclopropanecarboxamide, ("KTU 3616");
 manganese ethylenebis(dithiocarbamate)polymer-zinc complex, ("mancozeb");
 1-[2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan--2-ylmethyl]--1H-1,2,4--triazole,
 ("propiconazole");
 1-{2-[2-chloro-4-(4-chlorophenoxy)phenyl]-4-methyl--1,3-dioxolan--2-ylmethyl}--1H-
 1,2,4--triazole, ("difenoconazole");
 1-[2-(2,4-dichlorophenyl)pentyl--1H-1,2,4-triazole, ("penconazole");
 cis-4-[3-(4-tert-butylphenyl)--2-methylpropyl]--2,6-dimethylmorpholine,
 ("fenpropimorph");
 1-[3-(4-tert-butylphenyl)--2-methylpropyl]-piperidine, ("fenpropidin");
 4-cyclopropyl-6-methyl-N-phenyl-2-pyrimidinamine ("cyprodinil");
 (RS)-N-(2,6-dimethylphenyl--N-(methoxyacetyl)-alanine methyl ester ("metalaxyl",
 "ridomil");
 (R)-N-(2,6-dimethylphenyl--N-(methoxyacetyl)-alanine methyl ester ("R-metalaxyl");
 1,2,5,6-tetrahydro--4H-pyrrolo[3,2,1-ij]quinolin-4-one ("pyroquilon"); and
 ethyl hydrogen phosphonate ("fosetyl").

47. A method according to claim 33, wherein said microbicide is a fungicide selected from the following group:

- 4-[3-(4-chlorophenyl)-3-(3,4-dimethoxyphenyl)acryloyl]morpholine ("dimethomorph");
- 5-methyl-1,2,4-triazolo[3,4-b][1,3]benzothiazole ("tricyclazole");
- 3-allyloxy-1,2-benzothiazole-1,1-dioxide ("probonazole");
- μ -[2-(4-chlorophenyl)ethyl]-- μ -(1,1-dimethylethyl)-1H-1,2,4-triazole-1-ethanol, ("tebuconazol");
- 1-[[3-(2-chlorophenyl)-2--(4-fluorophenyl)oxiran-2-yl]methyl]-1H-1,2,4-triazole, ("epoxyconazol");
- μ -(4-chlorophenyl)-- μ -(1-cyclopropylethyl)--1H-1,2,4-triazole--1-ethanol, ("cyproconazol");
- 5-(4-chlorobenzyl)--2,2-dimethyl-1--(1H-1,2,4-triazol-1--ylmethyl)-cyclopentanol, ("metconazol");
- 2-(2,4-dichlorophenyl)--3-(1H-1,2,4-triazol-1-yl)-propyl--1,1,2,2-tetrafluoroethyl-ether, ("tetraconazol");
- methyl-(E)-2-{2-[6-(2-cyanophenoxy)pyrimidin-4-yloxy]phenyl}--3-methoxyacrylate, ("ICI A 5504", "azoxystrobin");
- methyl-(E)--2-methoximino--2-[μ -(o-tolyloxy)--o-tolyl]acetate, ("BAS 490 F", "cresoxime methyl");
- 2-(2-phenoxyphenyl)-(E)-2-methoximino--N-methylacetamide);
- [2-(2,5-dimethylphenoxy)methyl]-phenyl)-(E)--2-methoximino-N-methylacetamide);
- (1R,3S/1S,3R)-2,2-dichloro--N-[(R)-1-(4-chlorophenyl)ethyl]--1-ethyl-3-methylcyclopropanecarboxamide, ("KTU 3616");
- manganese ethylenebis(dithiocarbamate)polymer-zinc complex, ("mancozeb");
- 1-[2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan--2-ylmethyl]--1H-1,2,4--triazole, ("propiconazole");
- 1-{2-[2-chloro-4-(4-chlorophenoxy)phenyl]-4-methyl--1,3-dioxolan--2-ylmethyl}--1H-1,2,4--triazole, ("difenoconazole");
- 1-[2-(2,4-dichlorophenyl)pentyl--1H-1,2,4-triazole, ("penconazole");
- cis-4-[3-(4-tert-butylphenyl)--2-methylpropyl]--2,6-dimethylmorpholine, ("fenpropimorph");

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1-[3-(4-tert-butylphenyl)--2-methylpropyl]-piperidine, ("fenpropidin");
4-cyclopropyl-6-methyl-N-phenyl-2-pyrimidinamine ("cyprodinil");
(RS)-N-(2,6-dimethylphenyl--N-(methoxyacetyl)-alanine methyl ester ("metalaxyl",
"ridomil");
(R)-N-(2,6-dimethylphenyl--N-(methoxyacetyl)-alanine methyl ester ("R-metalaxyl");
1,2,5,6-tetrahydro--4H-pyrrolo[3,2,1-ij]quinolin-4-one ("pyroquilon"); and
ethyl hydrogen phosphonate ("fosetyl").

48. A method according to claim 47, wherein said fungicide is fosetyl.
49. A method according to claim 35, wherein said microbicide is fosetyl.
50. A method according to claim 1, wherein said microbicide is either a benzothiadiazole compound, an isonicotinic acid compound, or a salicylic acid compound.
51. A method according to claim 50, wherein said microbicide is a benzothiadiazole compound.
52. A method according to claim 51, wherein said benzothiadiazole compound is benzo(1,2,3)thiadiazole-7-carbothioic acid *S*-methyl ester.
53. A method according to claim 2, wherein said microbicide is either a benzothiadiazole compound, an isonicotinic acid compound, or a salicylic acid compound.
54. A method according to claim 53, wherein said microbicide is a benzothiadiazole compound.
55. A method according to claim 54, wherein said benzothiadiazole compound is benzo(1,2,3)thiadiazole-7-carbothioic acid *S*-methyl ester.

56. A method according to claim 4, wherein said microbicide is either a benzothiadiazole compound, an isonicotinic acid compound, or a salicylic acid compound.

57. A method according to claim 56, wherein said microbicide is a benzothiadiazole compound.

58. A method according to claim 6, wherein said microbicide is either a benzothiadiazole compound, an isonicotinic acid compound, or a salicylic acid compound.

59. A method according to claim 58, wherein said microbicide is a benzothiadiazole compound.

60. A method according to claim 7, wherein said microbicide is either a benzothiadiazole compound, an isonicotinic acid compound, or a salicylic acid compound.

61. A method according to claim 60, wherein said microbicide is a benzothiadiazole compound.

62. A method according to claim 61, wherein said benzothiadiazole compound is benzo(1,2,3)thiadiazole-7-carbothioic acid S-methyl ester.

63. A method according to claim 12, wherein said microbicide is either a benzothiadiazole compound, an isonicotinic acid compound, or a salicylic acid compound.

64. A method according to claim 63, wherein said microbicide is a benzothiadiazole compound.

65. A method according to claim 1, wherein two microbicides are concurrently applied to said immunomodulated plant.

66. A method according to claim 65, wherein one of said microbicides is a fungicide selected from the following group:

4-[3-(4-chlorophenyl)-3-(3,4-dimethoxyphenyl)acryloyl]morpholine ("dimethomorph");
5-methyl-1,2,4-triazolo[3,4-b][1,3]benzothiazole ("tricyclazole");
3-allyloxy-1,2-benzothiazole-1,1-dioxide ("probonazole");
 μ -[2-(4-chlorophenyl)ethyl]- μ -(1,1-dimethylethyl)-1H-1,2,4-triazole-1-ethanol, ("tebuconazol");
1-[[3-(2-chlorophenyl)-2--(4-fluorophenyl)oxiran-2-yl]methyl]-1H-1,2,4-triazole, ("epoxyconazol");
 μ -(4-chlorophenyl)-- μ -(1-cyclopropylethyl)--1H-1,2,4-triazole--1-ethanol, ("cyproconazol");
5-(4-chlorobenzyl)--2,2-dimethyl-1--(1H-1,2,4-triazol-1--ylmethyl)-cyclopentanol, ("metconazol");
2-(2,4-dichlorophenyl)--3-(1H-1,2,4-triazol-1-yl)-propyl--1,1,2,2-tetrafluoroethyl-ether, ("tetraconazol");
methyl-(E)-2-{2-[6-(2-cyanophenoxy)pyrimidin-4-yloxy]phenyl}-3-methoxyacrylate, ("ICI A 5504", "azoxystrobin");
methyl-(E)--2-methoximino--2-[μ -(o-tolyloxy)--o-tolyl]acetate, ("BAS 490 F", "cresoxime methyl");
2-(2-phenoxyphenyl)-(E)-2-methoximino--N-methylacetamide);
[2-(2,5-dimethylphenoxy)methyl]-phenyl)-(E)--2-methoximino-N-methylacetamide);
(1R,3S/1S,3R)-2,2-dichloro--N-[(R)-1-(4-chlorophenyl)ethyl]-1-ethyl-3-methylcyclopropanecarboxamide, ("KTU 3616");
manganese ethylenebis(dithiocarbamate)polymer-zinc complex, ("mancozeb");
1-[2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan-2-ylmethyl]-1H-1,2,4-triazole, ("propiconazole");
1-{2-[2-chloro-4-(4-chlorophenoxy)phenyl]-4-methyl-1,3-dioxolan-2-ylmethyl}-1H-1,2,4-triazole, ("difenoconazole");
1-[2-(2,4-dichlorophenyl)pentyl]-1H-1,2,4-triazole, ("penconazole");
cis-4-[3-(4-tert-butylphenyl)-2-methylpropyl]-2,6-dimethylmorpholine, ("fenpropimorph");

1-[3-(4-tert-butylphenyl)--2-methylpropyl]-piperidine ("fenpropidin");
4-cyclopropyl-6-methyl-N-phenyl-2-pyrimidinamine ("cyprodinil");
(RS)-N-(2,6-dimethylphenyl)-N-(methoxyacetyl)-alanine methyl ester ("metalaxyl",
"ridomil");
(R)-N-(2,6-dimethylphenyl)-N-(methoxyacetyl)-alanine methyl ester ("R-metalaxyl");
1,2,5,6-tetrahydro-4H-pyrrolo[3,2,1-ij]quinolin-4-one ("pyroquilon"); and
ethyl hydrogen phosphonate ("fosetyl");
and the other microbicide is either a benzothiadiazole compound, an isonicotinic acid compound,
or a salicylic acid compound.

67. A method according to claim 66, wherein the fungicide is metalaxyl and the other
microbicide is a benzothiadiazole compound.

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